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ABSTRACT

To facilitate the secondary analysis of citizenship and social studies data collected by the National Assessment for Educational Progress, this project constructed a set of three consolidated data archives and provided a simplified documentation system for users. The three consolidated files produced were (1) the 1971-72 Social Studies Assessment, (2) the 1975-76 Citizenship and Social Studies Assessments, and (3) two cohort files for 9-13-year-olds and for 13-17-year-olds. The project also explored the feasibility of constructing indices and scales that would bridge across packages and age groups, but the distribution of the items was too thin to allow the use of a factor analysis methodology for the identification of comparable items. (Author)

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FINAL REPORT

The Efficacy of Alternative Strategies for the Measurement and Analysis of Citizenship/Social Science Achievement Across Time and Age Groups

Contract No. 02-81-20315

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June 1, 1982

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To facilitate the secondary analysis of citizenship and social studies data collected by the National Assessment for Educational Progress, this project constructed a set of three consolidated data archives and provided a simplified documentation system for users. The three consolidated files produced were (1) the 1971-72 Social Studies Assessment, (2) the 1975-76 Citizenship and Social Studies Assessments, and (3) two cohort files for 9-13 year-olds and for 13-17 year-olds. The project also explored the feasibility of constructing indices and scales that would bridge across packages and age groups, but the distribution of the items was too thin to allow the use of a factor analysis methodology for the identification of comparable items.

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BACKGROUND OF THE PROJECT

The original design of the sampling and data collection procedures for the National Assessment stressed the concept of repeated measures over time, with each set of measures drawn from a larger pool of items. This design reflected the assessment mission of NAEP. The result was a data collection pattern that utilized a large number of packages of individual test items for each of three age groups. Although most of the items are used for most age groups and in all years, the distribution of items within packages follows no pattern and thus it has been most difficult for secondary analysts who use single packages or a combination of two or three packages to find the same items for cross-tabulation or analytic purposes.

Although the NAEP has made major improvements in the format and availability of the data sets, the basic format is still the test package. For a secondary analyst interested in the social studies or citizenship assessments, this would mean looking at approximately 25 packages for the Year 3 data and about 20 packages for the Year 7 data. The codebooks alone create a stack of material more than eight feet in height. Most secondary analysts are unwilling to take the time to sort through these numerous codebooks and to identify those packages of particular interest. Even if a secondary analyst were willing to make the effort to search the individual package codebooks and find a set of comparable items, many of these potential analysts do not have the necessary programming skills (or access to the resources to hire those skills) to make the necessary file mergers and to construct an consolidated analysis file.

As a result of these factors, we have observed a relatively low rate of use of the very valuable NAEP data sets for secondary analysis. The purposes of this proposal were (1) to investigate the possibility of using the Statistical Package for the Social Sciences (SPSS) to construct consolidated files that would provide a common index of variables and (2) to examine the potential for constructing comparable indices across age and year groups. The achievement of these two objectives should facilitate secondary analysis and encourage greater use of the NAEP data.

WORK COMPLETED

During the period of the contract, a successful file merger procedure was developed and three major consolidated files were completed. A series of attempts were made to construct comparable indices across age and year groups, but only limited success was obtained. It may be useful to describe each set of efforts in more detail and to assess the utility of each outcome.

The major achievement of the project was the identification of a method for the consolidation of all of the packages from a given test year into a single SPSS save file, with a common codebook and variable index. The work was done on the Year 3 and Year 7 assessments for citizenship and social studies and the feasibility of the process was demonstrated. The system was presented to the Second Workshop on the Secondary Analysis of NAEP Data, held at Northern Illinois University in November, 1981, and was favorably received by a wide range of users.

As a result of the file construction efforts, three major user files and codebooks were created:

(1) Year 3 Social Studies.
This tape file contains all of the individual packages for Year 3 from all three age groups. A common codebook displays the location of each variable and a user may select items that are common across age groups by specifying the packages (or subfiles, in SPSS terms) containing those items. A single two-inch codebook replaces the almost five feet of individual package codebooks that would have been necessary otherwise.

(2) Year 7 Citizenship/Social Studies.
This tape file contains all of the individual packages for Year 7 from all three age groups. As above, a common codebook displays the location of variables across packages and age groups.

(3) Year 3-Year 7 Cohort File.
This tape file includes all of the comparable items from two cohorts that were included in the Year 3 and Year 7 assessments. One file includes the 9-year-olds from Year 3 and the 13-year-olds from Year 7, which represent two independent samples of the same age cohort, four years apart. A second file includes the 13-year-olds from Year 3 and the 17-year-olds from Year 7, which form a second set of two independent samples of a single age cohort four years apart. These two files provide easy user access to two very important data sets that were not previously available for secondary analysis without enormous programming and documentation effort.

The data processing for the tape files has been completed and the codebooks are included with this report. In the appendices to the codebooks, the full text of all released items is provided and the short text of secure items. We have also prepared comparable pages that include the full text of the secure items (stamped to indicate the restricted nature of the item) and we would recommend that these additional pages be made available to interested scholars by NAEP upon the signing of a non-disclosure statement by the individual researcher.

We are convinced that the quality of the analysis will be improved by some form of access to the full text of all items.

It should be noted that the construction of these files involved both extensive programming efforts, which were preformed mainly by Janet McConeghy, but also extensive work in compiling old records from the NAEP staff for documentation purposes. Both David Wright and Susan Oldefendt provided extraordinary assistance in searching the NAEP files for records of coding decisions and variable definitions that were invaluable to the file construction process.

The second phase of the work involved the effort to construct comparable indices across age and year groups that would provide additional tools for the secondary analyst. In this effort, our success was limited.

Working from the plan outlined in the proposal, gamma matrices were constructed for sets of items from all packages in each age group and these matrices were subjected to a factor analysis. It was hoped that there would emerge some comparable factors that could be compared analytically, even though the identical items were not included. This approach assumed that the distribution of items within packages might have been done purposefully, with a given number of items coming from each of the major objectives around which the test items was constructed. That assumption turned out not to be true and there is no pattern of item assignment within the citizenship/social studies packages for either Year 3 or Year 7.

In the year 7 data set, for example, we systematically constructed gamma matrices for each of the packages and factor analyzed each

matrix. In gneral, one major factor emerged for each package that accounted for about 70 per cent of the common variance, but only about 30 per cent of the total variance. It appeared that this factor represented a general knowledge or skill level in citizenship and social studies. Although several additional factors usually emerged with eigen values greater than 1.0, they did not have an interpretable character and generally accounted for only trivial amounts of variance in the matrix. In no case did the pattern of factors resemble the objective structure, which had been our orginal hope and which might have provided the foundation for the construction of comparable indices.

It now appears to us that the relative small number of items in each NAEP package and the large number of objectives from which they are drawn preclude the development of comparable indices across packages and age groups that are based on more than two or three items. If at some future date, the NAEP should reconsider its present sampling design and package format, some consideration should be given to increasing the size of the test packages and to providing for a more systematic replication of items across packages and age groups and years.

Since the proposed approach did not work, an alternative was explored and promises some success. In studying the distribution of items across packages and years, it appeared that about two-thirds of the items do appear in all three age groups, although not in the same packages in every case. Using attitudes toward law and rules as a test case, we found that it was possible to find sets of seven items that were comparable across packages in all age groups in Year 7 and

that this analytic subset constituted a pool of just over 12,000 cases. This is a very useful study population size, and we found it possible to build seven-variable log-linear models that had a high level of statistical significance and a good cell distribution. While the success of this approach will vary some by the topic that the secondary analyst investigates, it appears from our work with the codebooks that there are a wide range of topics in which the identical items will appear in enough individual packages to provide a case pool in the 12,000 range.

THE FUTURE UTILITY OF THE INTEGRATED DATA BASES

A full set of materials have been made available to NAEP with this report for distribution to the academic and secondary analysis communities. On the basis of the first reactions of those social science educators who have seen the system, it appears that there will be a strong demand for these files. While the final distribution strategy is the responsibility of the NAEP, we would make the following recommendations:

(1) A set of codebooks and tapes should be deposited with the Inter-University Consortium for Political and Social Research (ICPSR), located at the University of Michigan. This is the major repository for secondary analysis data sets in the United States and will assure wider utilization of the NAEP Data.

(2) That NAEP conducts or arranges for introductory user orientation sessions at annual meetings like the American Educational Research Association (AERA) and similar educational and social science organizations.

(3) That NAEP sponsors or co-sponsors short-term training workshops to orient new users to the consolidated file structure and the computing technologies necessary for their utilization. Training in newer quantitative methods appropriate to the NAEP data (log-linear models, LISREL, latent-trait analysis) should also be

made available.